



AN ENVIRONMENTAL SERVICES COMPANY

**GROUNDWATER/SOIL STUDY
ROEHR CHEMICAL COMPANY
GREENPOINT AVENUE
LONG ISLAND CITY, NEW YORK**

441196



GROUNDWATER/SOIL STUDY

PREPARED FOR:

**ROEHR CHEMICAL COMPANY
GREENPOINT AVENUE
LONG ISLAND CITY, NEW YORK**

PREPARED BY:

**YWC, INC.
200 MONROE TURNPIKE
MONROE, CONNECTICUT**

**APRIL 1990
YWC PROJECT NO. 06-6441-00**

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1.0 INTRODUCTION

This report has been prepared by YWC on behalf of Roehr Chemical Company, located at Greenpoint Avenue in Long Island City, New York. The purpose of this report is to document findings of the site study that was conducted by YWC. The study was implemented to identify any impact to the soils or groundwaters on the site resulting from minor methanol and isopropanol storage tank leaks.

In summary in conducting the assessment, YWC found no evidence that would indicate a severe impact to the site environment resulting from storage tank leaks, accidental discharges or past site activities. Low levels of chlorinated solvents have been detected in the groundwaters. Although the source of this contamination could not be determined by the limited scope of this assessment, it is not likely the groundwater contamination is associated with the Roehr facility operations or past on-site tank leaks.

2.0 BACKGROUND

Roehr Chemical Company is a manufacturer of pharmaceutical products. The company is located in the Queens Borough of New York City. Figure 1 presents a site location map.

The New York City Department of Environmental Protection (DEP) conducted an inspection of the property during the Summer of 1989. Although no major violations were discovered, the DEP raised some concerns regarding wastewater discharges to the public sewage system. The DEP referred the company to the New York State Department of Environmental Conservation (DEC). Responding to DEP concerns, the DEC conducted an investigation which resulted in a request for the company to conduct tests on the following three underground storage tanks located on the facility property:

- a 1,500 gallon methanol storage tank;
- a 1,500 gallon xylene storage tank; and
- a 1,500 gallon isopropanol storage tank.

Results of the test indicated minor leaks had occurred in the piping system of the methanol and isopropanol tanks. Based on the information developed during the testing of the tanks, the DEC requested Roehr Chemical to repair the leaks and conduct a groundwater/soil study to determine if the identified leaks have negatively impacted the site's environment.

Roehr Chemical retained YWC to perform a study to determine site soil/groundwater quality. YWC was not involved with any tank system repair work. YWC implemented the study following (with minor exceptions) DEC requests which are outlined as follows:

- four monitoring wells were installed in the specific locations specified by the DEC. The wells were to be constructed of two inch diameter carbon steel.

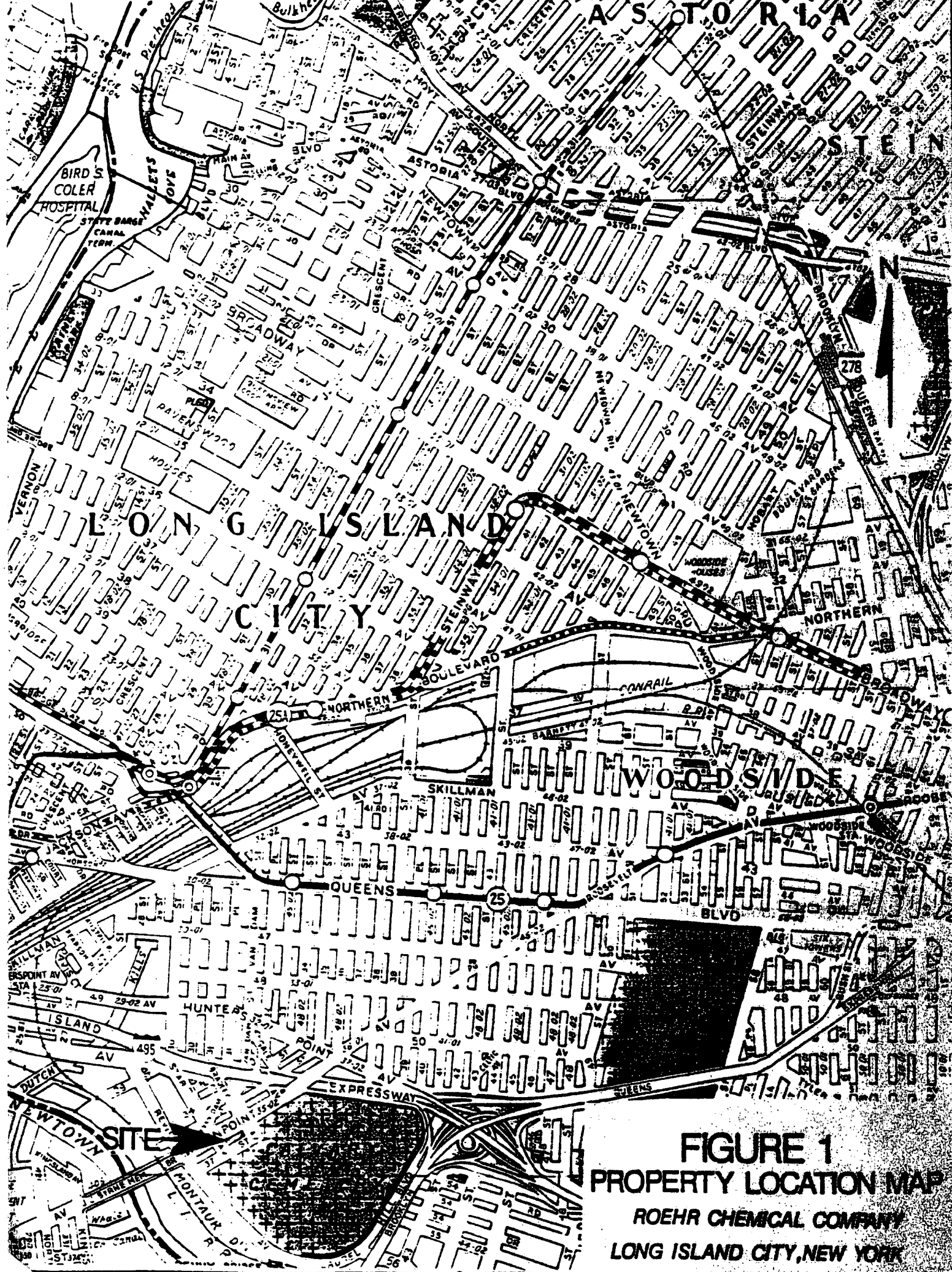


FIGURE 1
PROPERTY LOCATION MAP
ROEHR CHEMICAL COMPANY
LONG ISLAND CITY, NEW YORK

- the wells were sampled for analyses of the EPA target compound list of volatile organic compounds including methanol. Additionally, soil samples were obtained at the surface points of each monitoring well location. The samples were analyzed for the parameters specific to the site; and
- during bore hole drilling procedures, soil samples were obtained at five foot intervals via the split spoon method of sampling. An HNU photoionizer was utilized to screen the overburden material for suspected contaminations.

The DEC allowed two concessions which resulted in minor changes in scope of the originally proposed study:

- the use of PVC well construction material as an alternative to carbon steel was approved by the DEC. Initially, the DEC required the wells be constructed with stainless steel or carbon steel material due to their concerns regarding volatile absorption by PVC. However, a YWC December 28, 1989 letter referenced a study conducted by Radian Corporation which indicated there is no significance between PVC and stainless steel materials regarding sorption affections on organics; and
- well MW-2 was initially proposed to be installed inside the hazardous waste storage area. However, due to concerns regarding the exact location of underground piping of tanks and worker safety, the DEC decided to relocate the well (MW-2) just outside the tank area.

YWC conducted the entire project utilizing procedures outlined in a December 19, 1989 proposal to the State. The well drilling and sampling protocol was approved by the DEC prior to well installation.

3.0 AQUIFER/OVERBURDEN CHARACTERISTICS

Well installation procedures involved the hollow-stem auger method of drilling. Soil samples were obtained at five foot intervals utilizing the split-spoon method of sampling. Soil samples were inspected by a YWC geologist and characterized in a boring log. The boring logs developed at the Roehr Chemical site during well installation procedures are presented in Appendix A of this report.

Additionally, all soil samples were screened with a 11.7 eV HNU ionization meter to determine the possible presence of volatile organic compounds.

Observations made during well boring procedures indicate the overburden material beneath the site area are composed of fine to coarse sand and gravel. This material was deposited during the last glacial retreat. The general non-stratified nature of the material is due to an ice contact nature of the deposition. Additionally, a 7 to 12 foot thick layer of cobbles was encountered approximately 19 feet below grade at monitoring well MW-1, MW-2, and MW-3 (see Figure 2).

This layer may be present due to the location of an ancient stream bed.

Aquifers associated with these glacial deposits are generally productive. Groundwater movement through glacial aquifers are moderate. YWC has estimated the velocity of groundwater in the site area to be 7.4 feet/day. This figure was calculated using Darcy's Law which states:

$$\frac{V}{P} = \frac{KI}{.25} = \frac{125 \text{ ft/day} \times .0148 \text{ ft/ft}}{.25}$$

Where:

- V = Groundwater velocity
- K = Hydraulic conductivity
- I = Hydraulic gradient
- P = Porosity

- a value of 125 feet/day was utilized for hydraulic conductivity. This value is estimated for medium sand and gravel which is referenced in a report entitled "Guidelines for Level B Mapping Standards", prepared by the State of Connecticut Department of Environmental Protection;
- a porosity value of 25% was used. This value was obtained from a table referencing porosity values presented in a document entitled "Basic Groundwater Hydrogeology" by Ralph Heath (1984); and
- hydraulic gradient was calculated by determining the change of water elevation with distance between two measured points. Wells MW-4 and MW-3 (see Figure 2) were used as data points. The change in water elevation between the two wells is 3.52'. The distance between the two wells was measured to be 238 feet. Therefore:

$$I = \frac{DH}{DL} = \frac{3.52}{238} = .0148 \text{ ft/ft}$$

Based on this data, YWC estimates that the groundwaters beneath the site would eventually discharge into Newtown Creek in approximately 135 days.

4.0 GROUNDWATER INVESTIGATION

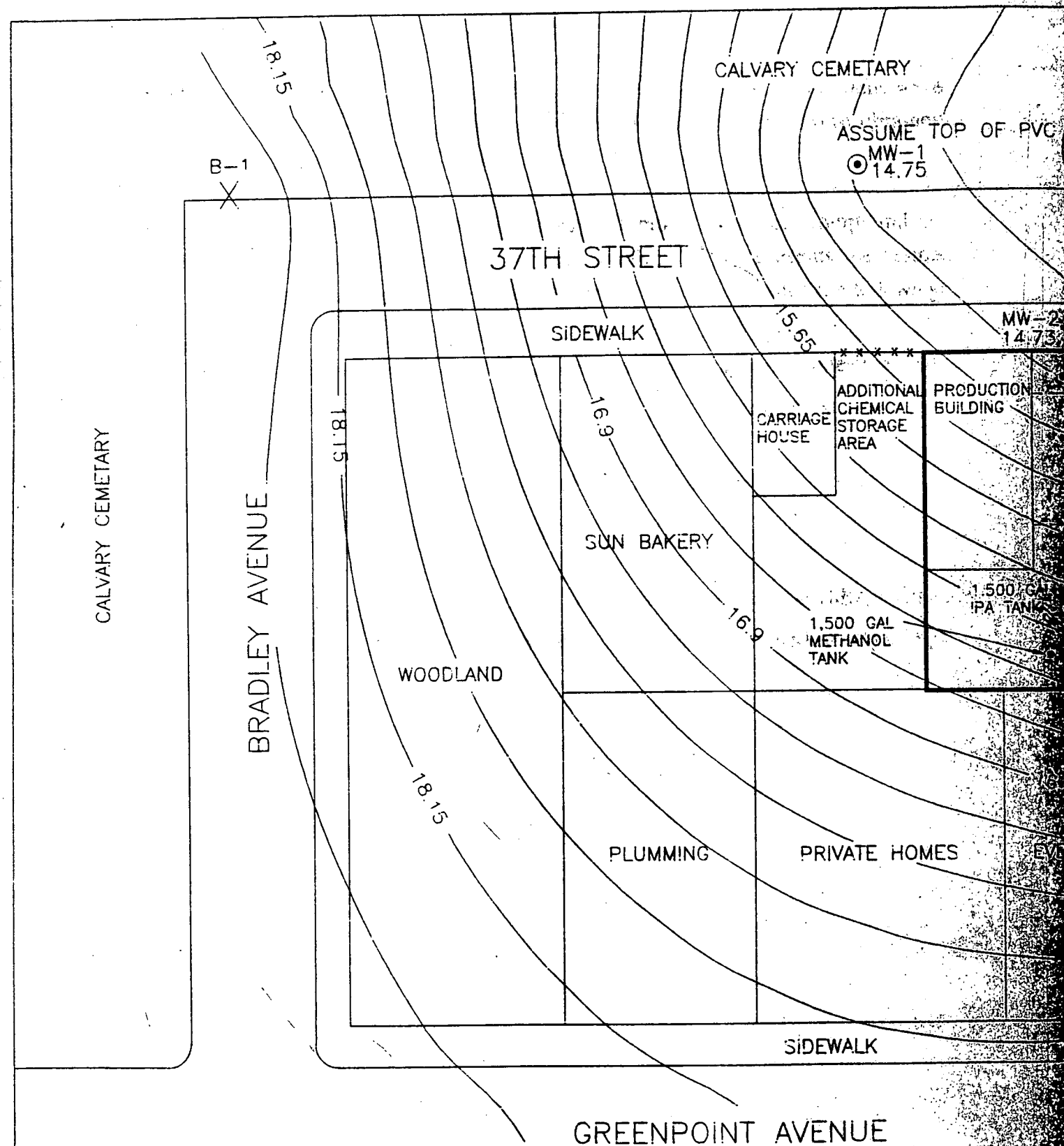
YWC conducted a groundwater quality assessment of the site to determine if groundwater quality has been impacted by the identified methanol tank pipe leak and/or past site activities. The investigation involved the installation and subsequent sampling of four monitoring wells. Data obtained from the monitoring wells was used to define:

- groundwater quality flowing onto and off the site;
- groundwater flow direction;
- aquifer characteristics; and
- overburden characteristics.

Four groundwater monitoring wells were installed on January 17 and 18, 1990 by Aquifer Drillers Inc. of Long Island City, New York, under the supervision of a YWC geologist. A site plan illustrating monitoring well locations is presented in Figure 2. Attempts to install an upgradient well (MW-1) on the corner of Bradley and 37th Street were unsuccessful due to auger refusal at 40'. The boring location was moved 250' east on 37th Street.

The wells were surveyed by a YWC geologist to determine groundwater elevation. A reference point of 50' PVC elevation was assumed for MW-1. The three remaining wells were surveyed in relation to that point.

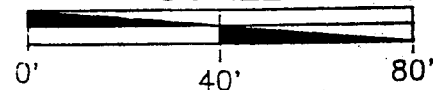
A groundwater contour map was developed utilizing the data obtained during the survey. A surfer™ program was used to generate a computer model of groundwater flow direction. Figure 3 presents a groundwater contour map which indicates a general north to south groundwater flow direction. Based on this information, it appears MW-1 and MW-4 would monitor groundwater quality flowing onto the site, and MW-2 and MW-3 would monitor groundwater quality as it flows off of the site. Additionally, MW-2 appears appropriately located to sufficiently monitor any impacts to groundwater quality resulting from tank system failures.



LEGEND

- X SOIL BORING
- ⊙ MONITORING WELL
- UNDERGROUND STORAGE TANKS
- ***** FENCE

SCALE



SER = 50.00' A.S.L.

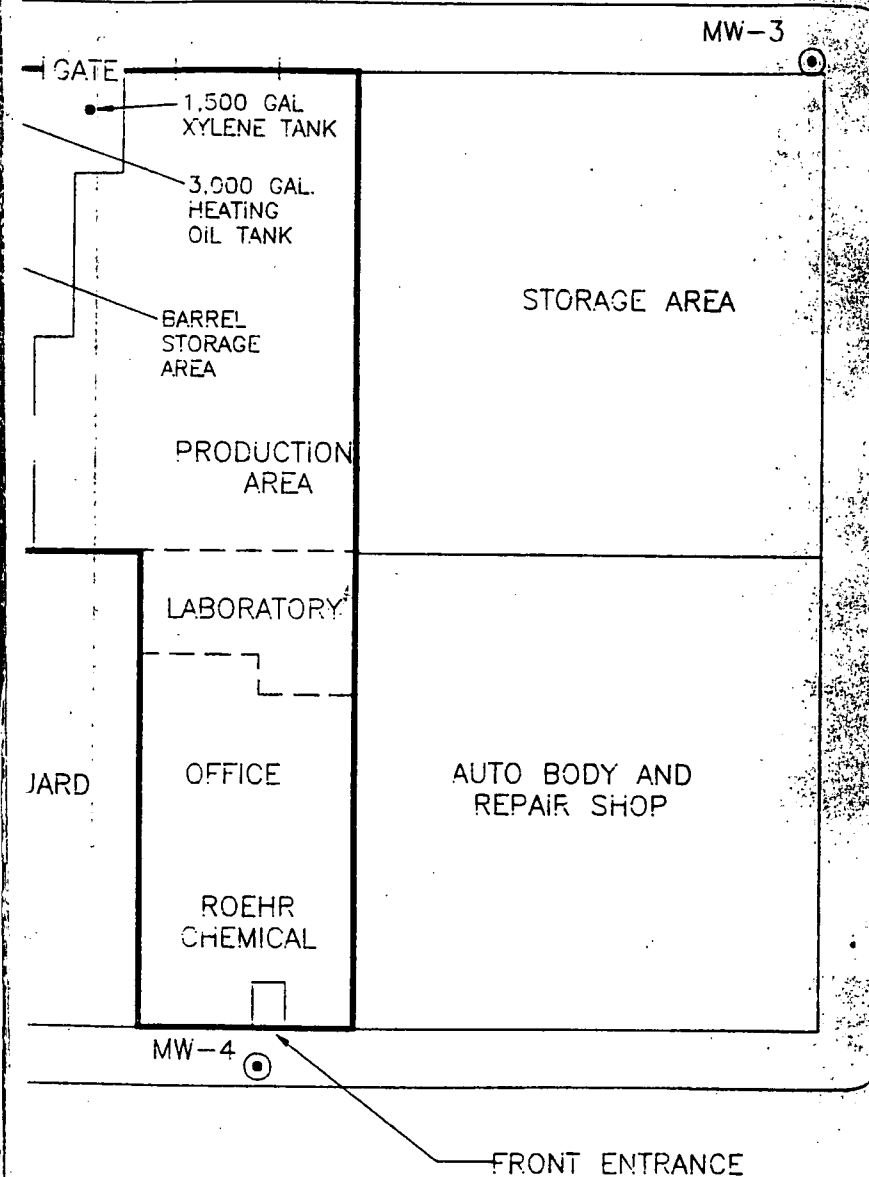
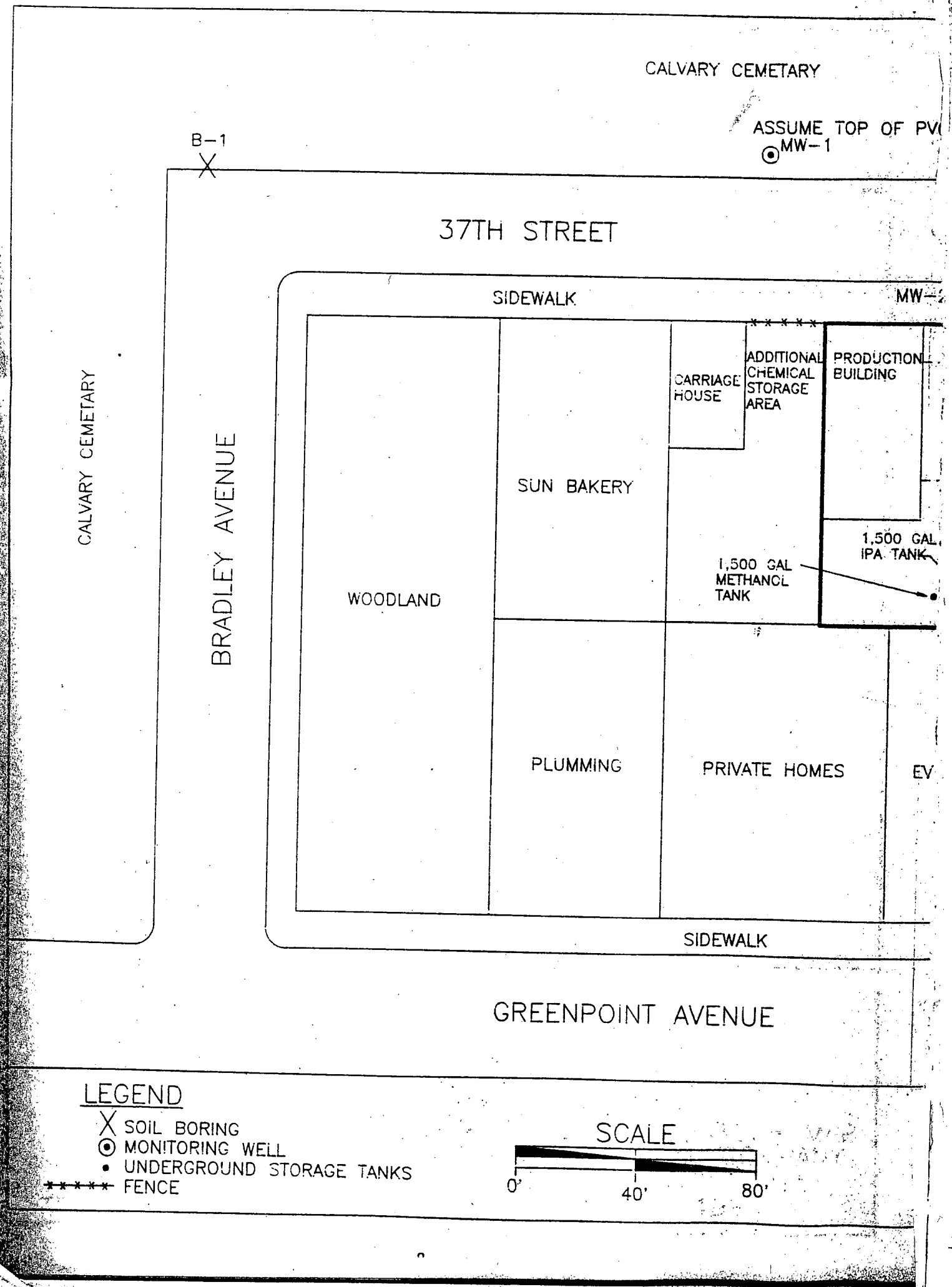


FIGURE 2

SITE MAP
ROEHR CHEMICAL COMPANY
LONG ISLAND CITY, N.Y.
JANUARY, 1990



LEGEND

- X SOIL BORING
- MONITORING WELL
- UNDERGROUND STORAGE TANKS
- ***** FENCE

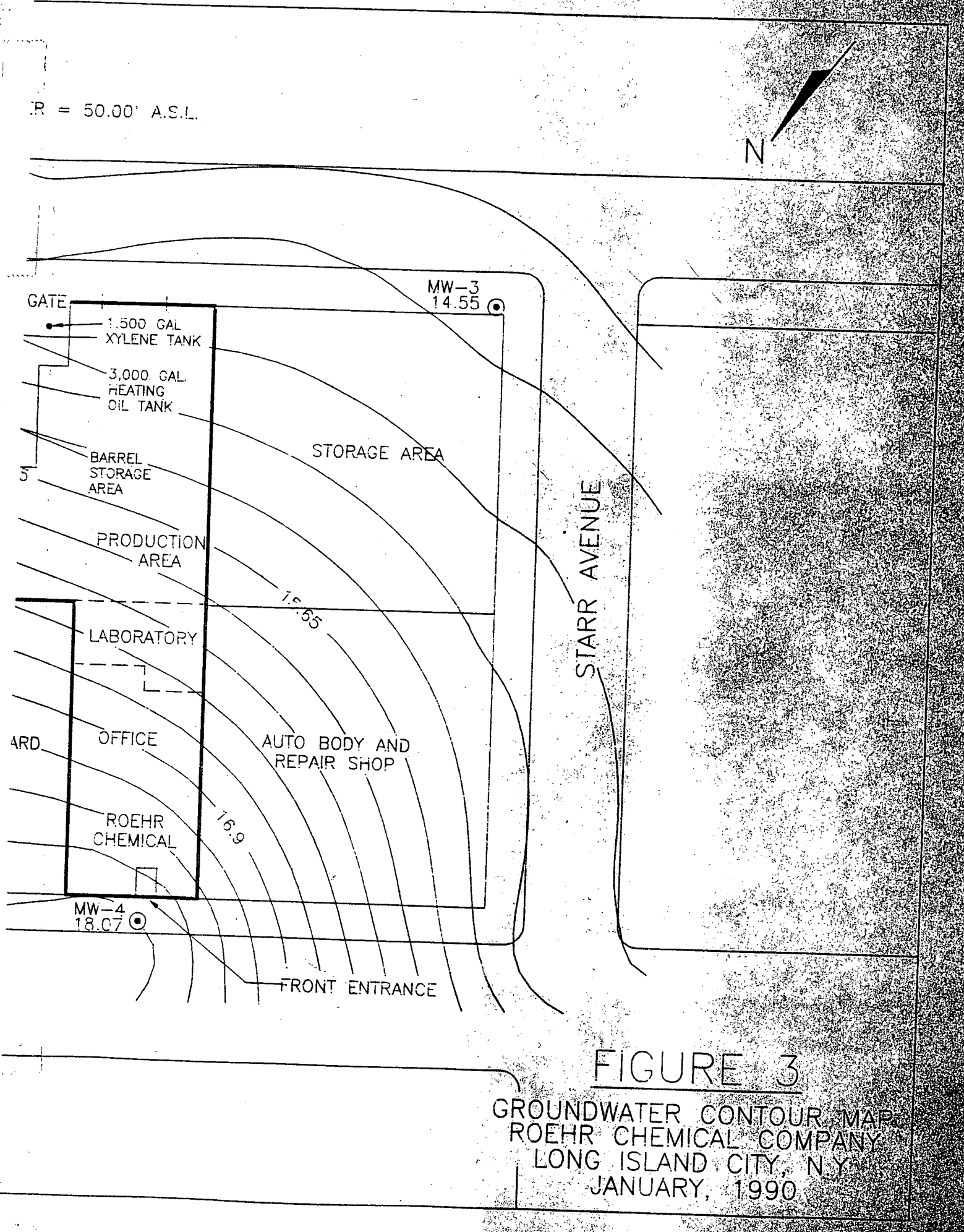
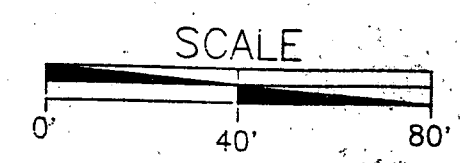


FIGURE 3

GROUNDWATER CONTOUR MAP
ROEHR CHEMICAL COMPANY
LONG ISLAND CITY, N.Y.
JANUARY, 1990

The wells were sampled on February 7, 1990 by a YWC geologist. The wells were purged by bailing three times the calculated well volume. The samples were obtained using a laboratory decontaminated stainless steel bailer.

Obtained samples were analyzed for volatile organic compounds (target compound list (CLP method) including methanol (GC direct injection). Table 1 presents the results generated from the February sampling event. Review of Table 1 indicates the following:

- parameters associated with Roehr Chemical Inc., specifically toluene, xylene, and methanol, were not detected in any of the four monitoring wells;
- low levels of trichloroethene and tetrachloroethene appear to be entering the site from an unidentified upgradient source; and
- breakdown products associated with tetrachloroethene, 1,1,1 trichloroethane, and trichloroethene, were exhibited by the sample obtained at upgradient well MW-4.

TABLE 1
ANALYTICAL RESULTS-WATER SAMPLES
ROEHR CHEMICAL
NEW YORK, NEW YORK
EPA TCL
VOLATILE COMPOUNDS

All Results Reported as ppb

<u>Method Blank I.D.</u>	<u>MW-1</u>	<u>MW-2</u>	<u>MW-3</u>	<u>MW-4</u>	<u>Method Detection Limit with no Dilution</u>
<u>Compound</u>					
chloromethane	U	U	U	U	10
bromomethane	U	U	U	U	10
vinyl chloride	U	U	U	U	10
chloroethane	U	U	U	U	10
methylene chloride	U	U	U	U	5
acetone	U	U	U	U	10
carbon disulfide	U	U	U	U	1,000
1,1-dichloroethene	U	U	U	U	5
1,1-dichloroethane	U	U	U	U	5
trans-1,2-dichloroethene	U	U	U	U	5
chloroform	U	U	U	U	5
1,2-dichloroethane	U	U	U	U	5
2-butanone	U	U	U	U	10
1,1,1-trichloroethane	U	U	U	8	5
carbon tetrachloride	U	U	U	U	5
vinyl acetate	U	U	U	U	10
bromodichloromethane	U	U	U	U	5
1,1,2,2-tetrachloroethane	U	U	U	U	5
1,2-dichloropropane	U	U	U	U	5
trans-1,3-dichloropropene	U	U	U	U	5
trichloroethene	7	6	9	6	5
dibromochloromethane	U	U	U	U	5
1,1,2-trichloroethane	U	U	U	U	5
benzene	U	U	U	U	5
cis-1,3-dichloropropene	U	U	U	U	5
2-chloroethylvinylether	U	U	U	U	5
bromoform	U	U	U	U	5
2-hexanone	U	U	U	U	10
4-methyl-2-pentanone	U	U	U	U	10

TABLE 1 (continued)
ANALYTICAL RESULTS-WATER SAMPLES
ROEHR CHEMICAL
NEW YORK, NEW YORK
EPA TCL
VOLATILE COMPOUNDS

All Results Reported as ppb

<u>Method Blank I.D.</u>	<u>MW-1</u>	<u>MW-2</u>	<u>MW-3</u>	<u>MW-4</u>	<u>Method Detection Limit with no Dilution</u>
<u>Compound</u>					
tetrachloroethene	U	U	U	89	5
toluene	U	U	U	U	5
chlorobenzene	U	U	U	U	5
ethylbenzene	U	U	U	U	5
styrene	U	U	U	U	5
total xylene	U	U	U	U	5
methanol	U	U	U	U	1,000
pH (S.U.)	6.29	6.63	6.67	6.45	—
conductivity (umhos)	901	975	920	1100	—

NOTE:

U = Undetected.

5.0 SOIL INVESTIGATION PROGRAM

SURFACE SOIL SAMPLES

As mentioned previously, the DEC requested all soil samples be screened for volatile organic content by an 11.7 eV HNU photoionizer. The meter was calibrated to toluene in the laboratory and tested before screening each sample. Soil samples were obtained at five foot intervals by using a split spoon sampler. No evidence of significant contamination of the soils at the five bore hole locations was exhibited by the HNU meter.

Additionally, the DEC requested soil samples be obtained at the surface (0-2") of the four monitoring well locations and analyzed for the parameters specific to the site. Table 2 presents the analytical results of the soil samples. Review of Table 2 indicates the following:

- there were no parameters detected at locations MW-1, MW-2, and MW-3; and
- the surface soils obtained at location MW-4 exhibited low levels of tetrachloroethene. The sample was obtained six inches below the concrete sidewalk layer.

TABLE 2
ANALYTICAL RESULTS-SURFACE SOIL SAMPLES
ROEHR CHEMICAL
NEW YORK, NEW YORK
EPA TCL
VOLATILE COMPOUNDS

All Results Reported as ppb

<u>Method Blank I.D.</u>	<u>0-2'</u>	<u>0-2'</u>	<u>0-2'</u>	<u>0-2'</u>	<u>Method Detection</u>
<u>Compound</u>	<u>MW-1</u>	<u>MW-2</u>	<u>MW-3</u>	<u>MW-4</u>	<u>Limit with</u> <u>no Dilution</u>
chloromethane	U	U	U	U	10
bromomethane	U	U	U	U	10
vinyl chloride	U	U	U	U	10
chloroethane	U	U	U	U	10
methylene chloride	U	U	U	U	5
acetone	U	U	U	U	10
carbon disulfide	U	U	U	U	5
1,1-dichloroethene	U	U	U	U	5
1,1-dichloroethane	U	U	U	U	5
trans-1,2-dichloroethene	U	U	U	U	5
chloroform	U	U	U	U	5
1,2-dichloroethane	U	U	U	U	5
2-butanone	U	U	U	U	10
1,1,1-trichloroethane	U	U	U	U	5
carbon tetrachloride	U	U	U	U	5
vinyl acetate	U	U	U	U	10
bromodichloromethane	U	U	U	U	5
1,1,2,2-tetrachloroethane	U	U	U	U	5
1,2-dichloropropane	U	U	U	U	5
trans-1,3-dichloropropene	U	U	U	U	5
trichloroethene	U	U	U	U	5

TABLE 2 (continued)
ANALYTICAL RESULTS-SURFACE SOIL SAMPLES
ROEHR CHEMICAL
NEW YORK, NEW YORK
EPA TCL
VOLATILE COMPOUNDS

All Results Reported as ppb

<u>Method Blank I.D.</u>	<u>0-2'</u> <u>MW-1</u>	<u>0-2'</u> <u>MW-2</u>	<u>0-2'</u> <u>MW-3</u>	<u>0-2'</u> <u>MW-4</u>	<u>Method Detection</u> <u>Limit with</u> <u>no Dilution</u>
<u>Compound</u>					
dibromochloromethane	U	U	U	U	5
1,1,2-trichloroethane	U	U	U	U	5
benzene	U	U	U	U	5
cis-1,3-dichloropropene	U	U	U	U	5
2-chloroethylvinylether	U	U	U	U	5
bromoform	U	U	U	U	5
2-hexanone	U	U	U	U	10
4-methyl-2-pentanone	U	U	U	U	10
tetrachloroethene	U	U	U	49	5
toluene	U	U	U	U	5
chlorobenzene	U	U	U	U	5
ethylbenzene	U	U	U	U	5
styrene	U	U	U	U	5
total xylene	U	U	U	U	5
methanol	U	U	U	U	1,000

NOTE:

U = Undetected.

6.0 CONCLUSIONS

Based on the data obtained during the environmental study of Roehr Chemical Inc. located in New York, New York, the following conclusions are presented as follows:

- no evidence was found which would indicate a significant impact to the groundwaters beneath the site due to methanol or xylene tank system failures and/or past site activities;
- a low level plume of tetrachloroethene and its daughter compounds has been identified entering the property boundaries apparently from an undetermined off-site source; and
- the soil beneath the sidewalk on Greenpoint Avenue exhibit low levels of tetrachloroethene contamination.

YWC does not believe the contamination found in the area groundwaters and the soils at location MW-4 is due to any activities conducted at the Roehr Chemical facility. We base this conclusion on the information relayed to YWC by Roehr Chemical regarding the types of chemicals utilized during facility operations. This information indicates that chlorinated hydrocarbons such as trichloroethene (TCE) or tetrachloroethane (PCE) are not stored or utilized by the company. PCE and TCE are associated with many common solvents generally used by dry cleaners and auto repair/body shops. We suspect the plume of contamination may originate at a non-point source upgradient on Greenpoint Avenue. The large scale illegal dumping of debris on Bradley Avenue and 37th Street may be the area of most concern regarding the contaminate source.

The low level (of tetrachloroethene) contamination of soils at sample location MW-4 may be a result of auto repairs that take place in the area by a business and/or local residents. Limited scope of this study did not supply enough data to determine the extent of the identified soil contamination. We do not believe the source is due to activities at the Roehr Chemical facility. The area is in close proximity to the front door

of the company office area. The company does not accept deliveries or conduct facility operations involving chemicals in this area on Greenpoint Avenue.

The primary chemicals in underground storage at the Roehr facility are xylene and methanol. No evidence was found during this assessment which indicated significant discharges of these chemicals to the environment. The methanol tank was removed and new piping was installed. A secondary containment system which involved a cement tank grave has been constructed to prevent future accidental leakage to the environment. The soils that had been impacted by the minor methanol leak were removed during tank repair procedures.

The low levels of solvent contamination existent in the area groundwaters generally are a common occurrence in heavily urbanized areas such as Greenpoint Avenue.

ATTACH

OWNER: Roehr Chemical
 ADDRESS: 20-52 Greenpoint Avenue
Long Island City, New York

BORING NO: _____
 DATE STARTED: 1/17/90

WELL NO: MW-1
 DATE COMPLETED: 1/17/90

SHEET 1 OF 2

SOIL IDENTIFICATION

Remarks Include Soil Type, Grain Size, Color, Gradation, Rock Color, Type Condition, Hardness, Seams, Degree of Fracturing

Sample Depths From/To Type Of Sample Blows Per 6" On Sampler From To To Moisture Density Or Consist. Strata Change Depth

Location: Upgradient
37th Street

Drilling Company: Aquifer Drilling

Driller: Steve Wolf
 Drilling Method: HSA
 Sampling Method: SS, A
 Samples Examined By: R. Dirienzo
 Reference Point: Grade

Well Construction
 Screen Type: Schedule 40 PVC

Diam: 2" Slot No: 20
 Setting (BSL): 33.4-43.4
 Setting (Elevation): 16.6-6.6
 Riser Elevation: 20.00 (assured)
 Protector Elevation: ---
 Gravel Pack Size: #12 Flint Shot
 Protector: 5.1' dia. steel
 Static Water Level: 32.3'
 Riser Stick-Up (AGL): 3.05'
 Protector Stick-Up: 3.3'

0-14'	A	---	---	---	Medium Dense Moist	.5'	Organic sand & silt with debris to .5', then; sand, fine to medium, brown; little gravel & cobbles, medium, subangular
14-16	SS	20	29	23/25	Very Dense Moist	---	Sand, fine to medium, brown; little gravel & cobbles, medium, subangular
16-24	A	---	---	---	Very Dense Moist	17'	Very rough drilling - sand, gravel & cobbles
24-26	SS	10	10	14/12	Dense Moist	24'	Sand, fine to coarse, brown; little gravel, medium to coarse, subangular
26-34	A	---	---	---	Dense Moist	H ₂ O @ 34'	Same as above
34-36	SS	18	30	20/25	Very Dense Wet		Sand, fine to coarse, brown; little gravel, medium, sub-angular

REMARKS: sand pack 41.5-28.5, bentonite seal 28.5-26.5, well developed 5 gals bailer

140 LB. WT. x 30" FALL ON 2" O.D. SAMPLER

Cohesionless Density Cohesive Consistency DRILLING METHOD

SWELL TYPE PROPORTIONS USED
 Air Return Trace 0 To 10%
 Core Barrel Little 10 To 20%
 Washed Some 20 To 35%
 Solid Stem Auger 35 To 50%
 Rotary Bit
 Rotary Bit

SUMMARY
 Earth Boring 45' 10 - 30
 Rock Coring 0 10 - 30
 Samples (SS) 3 30 - 50

Loose 0 - 4 Soft
 Med. Dense 4 - 8 Med. Stiff
 Dense 8 - 15 Stiff
 Very Dense 15 - 30 Very Stiff
 30+ Hard

SSA - Solid Stem Auger
 HSA - Hollow Stem Auger
 CD - Casing Drive
 CS - Casing Spin
 AR - Air Rotary
 RB - Rotary Bit
 CB - Core Barrel

OWNER: Roehr Chemical BORING NO: _____ WELL NO: MW-1 SHEET 2 OF 2
ADDRESS: 20-52 Greenpoint Avenue DATE STARTED: 1/17/90 DATE COMPLETED: 1/17/90
Long Island City, New York

SOIL IDENTIFICATION

Remarks Include Soil Type, Grain Size, Color, Gradation, Rock Color, Type Condition, Hardness, Seams, Degree of Fracturing

Sample Depths From/To	Type Of Sample	Blows Per 6" On Sampler			Moisture Density Or Consist.	Strata Change Depth
		From	To			
		0-6	6-12	12-18		

Location: Upgradient
37th Street

Drilling Company: Aquifer Drilling

Driller: Steve Wolf
 Drilling Method: HSA
 Sampling Method: SS,A
 Samples Examined By: R. Dirienzo
 Reference Point: Grade

Well Construction
Screen Type: Schedule 40 PVC

Diam: 2" Slot No: 20
Setting (BGL): 33.4-43.4
Setting (Elevation): 16.6-6.6
Riser Elevation: 50.00 (assured)
Protector Elevation: ---
Gravel Pack Size: #12 Flint Shot
Protector: 5'1" dia. steel
Static Water Level: 32.3'
Riser Stick-Up (AGL) 3.05'
Protector Stick-Up: 3.3'

36-42	A	--	--	--	--		Sand, fine to coarse, brown; little gravel, medium, sub- angular
30-35	15	30	15	12/16	Ver. Brown	15'	Sand, fine to coarse, brown; little gravel, medium, sub- angular
25-31	15	30	15	12/16	Ver. Brown	15'	Sand & gravel, fine to coarse; brown; H.C. at 10'

REMARKS: sand pack 41.5-28.5, bentonite seal 28.5-26.5, well developed 5 gals bailer

140 LB. WP. x 30" FALL ON 2" O.D. SAMPLER

Cohesionless Density Cohesive Consistency KOLINS METHOD

SAMPLE TYPE	PROPORTIONS USED
1	100% 100% 100%
2	100% 100% 100%
3	100% 100% 100%
4	100% 100% 100%
5	100% 100% 100%
6	100% 100% 100%
7	100% 100% 100%
8	100% 100% 100%
9	100% 100% 100%
10	100% 100% 100%
11	100% 100% 100%
12	100% 100% 100%
13	100% 100% 100%
14	100% 100% 100%
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90	100% 100% 100%
91	100% 100% 100%
92	100% 100% 100%
93	100% 100% 100%
94	100% 100% 100%
95	100% 100% 100%
96	100% 100% 100%
97	100% 100% 100%
98	100% 100% 100%
99	100% 100% 100%
100	100% 100% 100%

SUMMARY

AB-	Air Return	Trace	0 To 10%
CB-	Carb. Dioxide	Little	10 To 20%
B -	Moisture	Some	20 To 35%
CS-	Sulfur Dioxide	And	35 To 50%
CO-	Carbon Monoxide		
NO-	Nitrogen Dioxide		

Earth Boring	45°	0 - 10
Rock Coring	0	10 - 30
Samples (SS)	1	30 - 50

Loose	0 - 4	Soft
Med. Dense	4 - 8	Med. Stiff
Dense	8 - 15	Stiff
Very Dense	15 - 30	Very Stiff
	30+	Hard

[illegible]

OWNER: Roehr Chemical
ADDRESS: 20-52 Greenpoint Avenue
Long Island City, New York

BORING NO: _____ WELL NO: MW-2
DATE STARTED: 1/18/90

SHEET 1 OF 1
DATE COMPLETED: 1/18/90

Location: 5' outside of
chemical storage
area
Drilling Company: Aquifer Drilling
Driller: Steve Wolf
Drilling Method: HSA
Sampling Method: SS, A
Samples Examined By: R. Dirienzo
Reference Point: Grade
Well Construction
Screen Type: Schedule 40 PVC
Diam: 2" Slot No: 20
Setting (BGL): 27.6-37.6
Setting (Elevation): 16.41-6.41
Riser Elevation: 44.01
Protector Elevation: —
Gravel Pack Size: #12 Flint Shot
Protector: Flush mount steel
Static Water Level: 30.5'
Riser Stick-Up (AGL): -.5
Protector Stick-Up: Flush

Sample Depths From/To	Type Of Sample	Blows Per 6" On Sampler			Moisture Density Or Consist.	Strata Change Depth	SOIL IDENTIFICATION Remarks Include Soil Type, Grain Size, Color, Gradation, Rock Color, Type Condition, Hardness, Seams, Degree of Fracturing
		From 0-6	To 6-12	12-18			
0-2	SS	1	1	1/4	Loose Moist	.5 2.5	.5' of concrete, then organic silt & sand with boulders & brick (fill) then; sand, fine to medium, brown; little gravel, medium, subangular
2-19	A	—	—	—	Dense Moist		Sand, fine to medium, brown; some gravel & cobbles, medium, subangular
19-27	A	—	—	—	Very Dense Moist	19'	Sand, fine to medium, brown; some gravel & cobbles, medium
28-29	A	—	—	—		28'	Sand, fine to medium, brown; gravel & cobbles, rough drilling
29-31	SS	20	13	17/16	Very Dense Wet	29'	Sand & gravel, fine to coarse, brown; H ₂ O at 30'
31-40*	A	—	—	—	Dense Wet		Sand & gravel, fine to coarse, brown; H ₂ O at 30'
REMARKS: End of boring at 41'							

SAMPLE TYPE		PROPORTIONS USED		SUMMARY		140 LB. WT. X 30" FALL ON 2" O.D. SAMPLER		COHESIONLESS DENSITY		COHESIVE CONSISTENCY		DRILLING METHOD	
AR=	Air Return	Trace	0 To 10%	Earth Boring	41'	0 - 10	Loose	0 - 4	Soft	SSA=	Solid Stem Auger		
CB=	Core Barrel	Little	10 To 20%	Rock Coring	0	10 - 30	Med. Dense	4 - 8	Med. Stiff	HSA=	Hollow Stem Auger		
W =	Washed	Some	20 To 35%	Samples (SS)	2	30 - 50	Dense	8 - 15	Stiff	Od =	Casing Drive		
SS=	Split Spoon	And	35 To 50%			50+	Very Dense	15 - 30	Very Stiff	Cs =	Casing Spin		
TP=	Test Pit							30+	Hard	Ar =	Air Rotary		
A =	Auger Flight									Rb =	Rotary Bit		
										Cb =	Core Barrel		

OWNER: Roehr Chemical BORING NO: WELL NO: MW-3 SHEET 1 OF 1
 ADDRESS: 20-52 Greenpoint Avenue DATE STARTED: 1/18/90 DATE COMPLETED: 1/18/90
Long Island City, New York

SOIL IDENTIFICATION

Sample Depths From/To Type Of Sample Blows Per 6" On Sampler From To 12-18 Moisture Density Or Consist. Strata Change Depth Remarks Include Soil Type, Grain Size, Color, Gradation, Rock Color, Type Condition, Hardness, Seams, Degree of Fracturing

Location: SE corner of building at Starr and 37th Ave.
 Drilling Company: Aquifer Drilling

Driller: Steve Wolf
 Drilling Method: HSA
 Sampling Method: SS, A
 Samples Examined By: R. Dirienzo
 Reference Point: Grade

Well Construction
 Screen Type: Schedule 40 PVC

Diam: 2" Slot No: 20
 Setting (BGL): 24.0-34.0
 Setting (Elevation): 15.9-5.9
 Riser Elevation: 39.90
 Protector Elevation: —
 Gravel Pack Size: #12 Flint Shot
 Protector: Flush steel
 Static Water Level: 27.25'
 Riser Stick-Up (AGL): -.5
 Protector Stick-Up: 0

0-2	SS	5	12	11/15	Medium Dense Moist	1'	Organic sand & silt (fill) then; sand, fine to medium, brown; some gravel, medium
2-15	A	—	—	—	—	15'	Sand, fine to coarse, brown; gravel; some cobbles
15-18	A	—	—	—	—	18'	Sand, gravel & cobbles
18-35	A	—	—	—	—	—	Sand, fine to coarse, brown; gravel & cobbles

REMARKS:

140 LB. WT. x 30" FALL ON 2" O.D. SAMPLER

Cohesionless Density Cohesive Consistency DRILLING METHOD

SAMPLE TYPE PROPORTIONS USED
 AB= Air Return Trace 0 To 10%
 CB= Core Barrel Little 10 To 20%
 W= Washed Some 20 To 35%
 SS= Split Spoon And 35 To 50%
 TP= Test Pit
 A= Auger Flight

SUMMARY
 Earth Boring 35' 0 - 10
 Rock Coring 0 10 - 30
 Samples (SS) 1 30 - 50
50+

Loose 0 - 4 Soft
 Med. Dense 4 - 8 Med. Stiff
 Dense 8 - 15 Stiff
 Very Dense 15 - 30 Very Stiff
30+ Hard

SSA= Solid Stem Auger
 HSA= Hollow Stem Auger
 CD= Casing Drive
 CS= Casing Spin
 AR= Air Rotary
 RB= Rotary Bit
 CB= Core Barrel

OWNER: Roehr Chemical
 ADDRESS: 20-52 Greenpoint Avenue
Long Island City, New York

BORING NO: _____
 DATE STARTED: 1/18/90

WELL NO: MW-4

SHEET 1 OF 1

DATE COMPLETED: 1/18/90

SOIL IDENTIFICATION

Remarks Include Soil Type, Grain Size, Color, Gradation, Rock Color, Type Condition, Hardness, Seams, Degree of Fracturing

Location: Greenpoint Ave.
near entrance

Drilling Company: Aquifer Drilling

Driller: Steve Wolf

Drilling Method: HSA

Sampling Method: SS, A

Samples Examined By: R. Dirienzo

Reference Point: Grade

Well Construction
 Screen Type: Schedule 40 PVC

Diam: 2" Slot No: 20

Setting (BGL): 19.0-29.0

Setting (Elevation): 19.65-9.65

Riser Elevation: 38.65

Protector Elevation: —

Gravel Pack Size: #12 Flint Shot

Protector: Flush steel

Static Water Level: 23.00'

Riser Stick-Up (AGL): -.5

Protector Stick-Up: 0

Sample Depths From/To	Type Of Sample	Blows Per 6" On Sampler			Moisture Density Or Consist.	Strata Change Depth	
		From 0-6	To 6-12	12-18			
0-3	A	—	—	—	Very Dense Dry	—	Old cobblestone, no split spoon sample possible
3-23	A	—	—	—	Medium Dense Wet	3'	Sand, fine to medium, brown; gravel, medium, subangular, some cobbles, medium
23-25	SS	9	10	20/10	Medium Dense Wet	H ₂ O @ 23'	Sand, fine to coarse, brown; gravel, medium, subangular
25-29	—	—	—	—	—	—	Sand, fine to coarse, brown; gravel, medium, subangular

REMARKS: 140 LB. WT. x 30" FALL ON 2" O.D. SAMPLER

SAMPLE TYPE

PROPORTIONS USED

SUMMARY

140 LB. WT. x 30" FALL ON 2" O.D. SAMPLER

Cohesionless Density

Cohesive Consistency

DRILLING METHOD

AR - Air Return
 CB - Core Barrel
 W - Washed
 SS - Split Spoon
 SP - Test Pit
 A - Auger Flight

Earth Boring 30'
 Rock Coring 0
 Samples (SS) 1
50+

Loose
 Med. Dense
 Dense
 Very Dense
 0 - 4 Soft
 4 - 8 Med. Stiff
 8 - 15 Stiff
 15 - 30 Very Stiff
 30+ Hard

SSA - Solid Stem Auger
 HSA - Hollow Stem Auger
 CD - Casing Drive
 CS - Casing Spin
 AR - Air Rotary
 RB - Rotary Bit
 CB - Core Barrel

OWNER: Roehr Chemical
 ADDRESS: 20-52 Greenpoint Avenue
Long Island City, New York

BORING NO: B WELL NO:
 DATE STARTED: 1/17/90

SHEET 1 OF 4
 DATE COMPLETED: 1/17/90

SOIL IDENTIFICATION

Remarks Include Soil Type, Grain Size, Color, Gradation, Rock Color, Type Condition, Hardness, Seams, Degree of Fracturing

Blows Per
 6" On Sampler
 Density Or Consist. Strata Change Depth
 Sample Depths From/To Type Of Sample From To 0-6 6-12 12-18

Location: Upgradient
corner of Bradley
and 37th Street
 Drilling Company: Aquifer Drilling

Driller: Steve Wolf
 Drilling Method: HSA
 Sampling Method: SS, A
 Samples Examined By: R. Dirienzo
 Reference Point: Grade

Well Construction
 Screen Type:

Diam: 2" Slot No:
 Setting (BGL):
 Setting (Elevation):
 Riser Elevation:
 Protector Elevation:
 Gravel Pack Size:
 Protector:
 Static Water Level:
 Riser Stick-Up (AGL):
 Protector Stick-Up:

0-2	SS	6	10	10/18	Medium Dense Moist	.5'	Organic sand & silt to .5', then sand, fine to medium, brown; little gravel, fine, subangular
2-9	A	---	---	---	Medium Dense Moist		Sand, fine to medium, brown; little gravel, fine to coarse, subangular; little cobbles, medium, subangular
9-11	SS	12	12	15/16	Dense Moist		Sand, fine to medium, brown; little gravel, fine to coarse, subangular
11-14	A	---	---	---	---		Same as above
14-16	SS	7	11	12/14	Dense Moist		Same as above
16-19	A	---	---	---	---		Same as above
19-21	SS	15	14	16/11	Dense Moist	19.5'	Sand, fine to medium, brown; some silt, fine; trace gravel, fine

REMARKS: No water indicated. Possibly bedrock at 40'.

140 LB. WT. X 30" FALL ON 2" O.D. SAMPLER

Cohesionless Density Cohesive Consistency DRILLING METHOD

SAMPLE TYPE PROPORTIONS USED
 AR - Air Return Trace 0 To 10%
 CR - Core Barrel Little 10 To 20%
 H - Washed Sand 20 To 35%
 SS - Split Specimen And 35 To 50%
 TR - Test PIT
 A - Auger Flight

SUMMARY

Earth Boring 40% 0 - 10
 Rock Coring 0 10 - 30
 Samples (SS) 4 30 - 50
 50%

Loose 0 - 4 Soft
 Med. Dense 4 - 8 Med. Stiff
 Dense 8 - 15 Stiff
 Very Dense 15 - 30 Very Stiff
 30+ Hard

SSA - Solid Stem Auger
 HSA - Hollow Stem Auger
 CD - Casing Drive
 CS - Casing Spin
 AR - Air Rotary
 RR - Rotary Bit
 CR - Core Barrel

OWNER: Roehr Chemical
ADDRESS: 20-52 Greenpoint Avenue
Long Island City, New York

BORING NO: B WELL NO: _____
DATE STARTED: 1/17/90

SHEET 2 OF 2
DATE COMPLETED: 1/17/90

Location:

Upgradient
corner of Bradley
and 37th Street
Aquifer Drilling

Drilling Company:

Driller:

Steve Wolf

Drilling Method:

HSA

Sampling Method:

SS,A

Samples Examined By: R. Dirienzo

Reference Point:

Grade

Well Construction

Screen Type:

Diam: 2" Slot No: _____

Setting (BGL): _____

Setting (Elevation): _____

Riser Elevation: _____

Protector Elevation: _____

Gravel Pack Size: _____

Protector: _____

Static Water Level: _____

Riser Stick-Up (AGL) _____

Protector Stick-Up: _____

Sample Depths From/To Type Of Sample Blows Per 6" On Sampler From To To Moisture Density Or Consist. Strata Change Depth

SOIL IDENTIFICATION
Remarks Include Soil Type, Grain Size, Color, Gradation, Rock Color, Type Condition, Hardness, Seams, Degree of Fracturing

21-28	A	—	—	—		—	Sand, fine to medium, brown; some silt, fine; trace gravel, fine
28-40	A	—	—	—		25'	Rough drilling, sand & gravel & cobbles
40'	A						Cobble or bedrock - auger refusal

REMARKS:

140 LB. WT. x 30" FALL ON 2" O.D. SAMPLER

Cohesionless Density Cohesive Consistency DRILLING METHOD

SAMPLE TYPE PROPORTIONS USED
Aps. Als. Return Trace 0 To 10%
Gr. Core Barrel Little 10 To 20%
W. S. Hatched Base 20 To 35%
Gr. Core Barrel Arch 35 To 50%
The Rock Pit
The Rock Pit

SUMMARY

Earth Boring 40'
Rock Coreing 0
Samples (SS) 4

0 - 10 Loose
10 - 30 Med. Dense
30 - 50 Dense
50 - 100 Very Dense

0 - 4 Soft
4 - 8 Med. Stiff
8 - 15 Stiff
15 - 30 Very Stiff
30 - Hard

SSA - Solid Stem Auger
HSA - Hollow Stem Auger
OA - Casing Drive
CA - Casing Split
SA - Solid Auger
HA - Hollow Auger
CA - Casing Drive